Meeting Minutes HIPPI-6400 Optical Working Group Tuesday 6 August 1996 Honolulu, Hawaii

These minutes prepared by Stan Swirhun of Vixel

Optical Interconnect Kickoff:

From 8:00 to 9:00 am Tuesday August 6, a kickoff meeting was held to frame the optical discussion that was to proceed that afternoon. Don Tolmie prepared and delivered the only presentation. Don distributed two candidate specifications templates: i) Wide interface Option (22 signals @ 500 Mb/s); ii) High performance Option (12 signals @ 1000 Mb/s) and encouraged the optical group to meet prior to the afternoon session to address how, when and where the template could be filled in. Brief discussion followed.

Steve Joiner proposed a 'pre-meeting' to precede the scheduled 3:00 PM working session; all agreed. Other business:

- 1) Three talks were scheduled for the afternoon session. Joiner (eye-safety), Griffin (vendor comparison), Swirhun (general specifications).
- 2) A discussion on the size of the application base for HIPPI-6400 was held. The driver for this request was the observation that larger HIPPI-6400 market opportunities enable payback of more aggressive approaches. Greg Chesson volunteered to project best case, typical and worst case HIPPI-6400 unit numbers.

Informal Pre-Meeting:

An informal pre-meeting was held at 2:00 PM prior to the HIPPI-6400 optical session. At that meeting the schedule and 'tee-up' of HIPPI-6400 issues was discussed. It was agreed that any and all decisions on approaches must be in the scheduled session. Discussion centered around:

- 1) Enumeration of the elements of a HIPPI-6400 optical specification. (Joiner, Szostak)
- 2) Realistic scheduling for establishment of a HIPPI-6400 optical specification. (Swirhun)
- 3) Connector, electrical interface, optical compatibility requirements. (Joiner, Rice, Theorin, Griffin, Szostak)
- 4) Employing the Fibre Channel specification as a template. (Swirhun, Joiner) Attendance was as follows:

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US Conec	704-323-8883	dknasel_conec@msn.com
Corning	607-974-4939	mcgill_cl@corning.com
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3M	512-984-3847	tszostak1@mmm.com
Siemens	608-982-1981	schelto@siements-fo.com
W.L. Gore	302-368-2575	ctheorin@wlgore.com
3M	612-733-6004	megriffin@msmail.mmmg.com
	AMP HP Vixel Sun US Conec Corning Siecor 3M Siemens W.L. Gore	AMP 717-986-7812 HP 408-435-6421 Vixel 303-460-0700 Sun 415-336-1506 US Conec 704-323-8883 Corning 607-974-4939 Siecor 704-327-5815 3M 512-984-3847 Siemens 608-982-1981 W.L. Gore 302-368-2575

Optical Interconnect Meeting

The HIPPI-6400 session on optical interconnects convened at 3:00 pm. Don Tolmie presided. Don presented a brief review of results from the Santa Fe meeting, followed by firm encouragement for progress by the group. The sentiment was echoed several times and at elevated intensity levels. Michael Griffin presented and edited a tabulation of candidate vendor approaches for a HIPPI-6400 implementation.

Steve Joiner presented information and constraints imposed by domestic (CDRH) and international (IEC) eye safety specifications upon HIPPI-6400 links. The key point of the ensuing discussion was that satsifying eye safety regulations would result in several simultaneous constraints. These constraints were on: launched optical power, emission NA, number of efibers/emission elements, fiber/emission element spacing, Open Fiber Control, expense of receiver, limitation/reduction in link budget, Class IIIB operation, long versus short wavelength sources, shuttered modules. Two questions were presented to the group and answered:

- i) Shall HIPPI-6400 consider Class IIIB Laser Operation? No.
- ii) Shall HIPPI-6400 consider Open Fiber Control, in the fashion of Fiber Channel? Not preferred, but acceptable as a last resort.

With Stan Swirhun as recorder the remaining two hours of the session proceeded to these conclusions:

- 1) The menu of candidate HIPPI-6400 solutions desired would be narrowed:
 - a) A 'slow' HIPPI-6400 optical interface option: 12 wide at 500 Mb/s
 - b) A 'fast" HIPPI-6400 optical interface option: 12 wide at 1000 Mb/s
 - c) A 'wide" HIPPI-6400 optical interface option: 22 wide at 500 Mb/s
- 2) The optical group present in Honolulu agreed it was willing to address two specs: a) 'fast' and b) 'slow' options. All further discussions, schedules and development at Honolulu would focus on these two.
- 3) IBM, as the champion of option c) should make a presentation at the Sept. interim meeting to establish the viability of the c) approach for HIPPI-6400.
- 4) After several difficult starts the following schedule for HIPPI-6400 Optical was more or less accepted. The group had difficulty targeting concrete goals beyond the connector.

Aug. plenary

HIPPI-6400 schedule and issues generation electrical/optical/connector specifications template generation

Sept. interim (via teleconference) and subsequent teleconferences

first pass electrical specifications connector criteria enumerated review laser safety implications: impact on optical specifications

Oct. plenary

final electrical first pass optical specs open invitation - candidate connector presentations (samples)

Nov. interim (via teleconference) and subsequent teleconferences

???

Dec plenary

(FIRM!) HIPPI connector decision

5) The following evaluation criteria for candidate HIPPI-6400 multifiber connectors was proposed. Further work targeted for Sept. teleconference and follow-ups.

i) existence: engineering samples by Oct. '96; prepilot quantities by Dec. '96

ii) maturity and industry acceptance: existing/imminent standard; ISO?

iii) attenuation 0.5 dB avg iv) return loss -20 dB

v) mating/demating durability 500 cycles (negotiable)

vi) fiber spacing/pitch don't care

vii) field termination?

viii) mechanical (usual array)

engagement force 20 N
cable retention 50 N
side pull 5 N
temperature -10/+60 C

humidity ? thermal cycle ?

ix) height, width <12.5 mm, <25mm

x) cut-out/faceplate opening smaller; small enough for FCC Cl. A

xi) polarized; keysxii) single mode capabledon't care, but is feature

xiii) low cost yes; not 'primary' importance

- 5) Craig Theorin volunteered to research and present a complete multimode fiber ribbon specification.
- 6) The following optical specifications were proposed, pending further discussion:

i) Wavelength 820-850nm

ii) Reach > 200m now; no future constraint

iii) Fiber core

iv) Skew, interchannel

fiber contributed < 5 ns (Tx+Rx) contributed < 1 ns Tx contributed < 0.5 ns Rx contributed < 0.5 ns

v)) Launch/receive power

dependent on laser safety approach, pitch, fiber BUT 'steal from Fibre Channel or Serial HIPPI to extent possible' consider -5 to -10 dBm

vi) Rise, fall, jitter, eye

'steal from Fibre Channel or Serial HIPPI to extent possible'

vii) Crosstalk ???

viii) Link Budget target 6 dB

7) Mechanical Configuration

i) 12x500 Mb/sii) 12x1000 Mb/stwo cables in each directionone cable in each direction

- 8) Open Issues
 - i) Laser safety consequences
 - ii) Realistic completed optical specifications dates
- 9) Steve Joiner volunteered to summarize optical launch considerations under following conditions:
 - 12 fiber, 62um silica, 6dB link budget, -5 dBm maximum launch